

Spin Database Tutorial

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Why needed?

For any asymmetry analysis, we need bunch-by-bunch spin-related information, fill pattern, spin pattern, relative luminosity, and so on. In addition to these, beam polarization and fill number are stored, for example.

Most important meaning of SpinDB is that this is OFFICIAL information by PWG.

But, practically, other way is also needed especially for the fact-track analysis, like ongoing run6 analysis. (I will discuss later.)

Contents of SpinDB

- Run number
- Fill number
- Crossing shift
- Scaler counts of GL1P scaler (relative luminosity)
- Spin pattern at IP12
(The pattern at PHENIX is reversed.)
 - +1 : Spin up
 - 1 : Spin down
 - 0 : Unpolarized bunch
 - 10 : Empty bunch
- Bad bunch flag (0:Good, 1:Bad)
- Beam polarization

C++ Utility for SpinDB

The utilities are available in your analysis code.
Just load (or link) “libuspin.so” with your library.

The location of source codes of SpinDB (uspin)

`$CVSROOT/offline/packages/uspin/`

The related file names are SpinDB***

The location of pre-compiled library.

`$OFFLINE_MAIN/lib/libuspin.so`

`$OFFLINE_MAIN/include/SpinDB***`

How to compile uspin library. (If you need)

pro version may not include SpinDB library.

```
rcas> cvs co offline/packages/uspin
```

```
rcas> offline/packages/uspin/autogen.sh --prefix=/phenix/.../YOUR_INST_DIR
```

```
rcas> make install
```

Then you can find libuspin.so in YOUR_INST_DIR/lib/.

Sample to access SpinDB

Sample to get run 170332.

```
rcas> root
root [0] gSystem->Load("YOUR_INST_DIR/lib/libuspin.so");
root [1] SpinDBContent spin_cont;
root [2] SpinDBOutput spin_out("phnxrc");
root [3] spin_out.StoreDBContent(170332,170332);
root [4] spin_out.GetDBContentStore(spin_cont,170332);
root [5] cout << spin_cont.GetFillNumber() << endl;
6980
```

If you are using “new” version library, you can use pre-compiled library. First command in ROOT can be

```
root [0] gSystem->Load("libuspin.so");
```

Note : SpinDB is just SQL database. You can also try

```
rcas> psql spin
```

Sample code for SpinDB

Sample code is placed at

/phenix/WWW/p/draft/fukao/SpinDB/SpinDBSample.C

This macro just dumps the contents of the database.

You can run the macro as following.

```
rcas> root
```

```
root [0] gSystem->Load("libuspin.so");
```

```
root [1] .x SpinDBSample.C (170332,170332);
```

```
Run number = 170332
```

```
Fill number = 6980
```

```
Bad run QA = 0
```

```
Crossing shift = 4
```

0:	2250401	593001	127982	53955	:	1	1	:	0	:	-0.467	+-	0.014	:	-0.423	+-	0.023
1:	1262	92	2	0	:	10	10	:	0	:	-0.467	+-	0.014	:	-0.423	+-	0.023
2:	2425251	637386	139758	58029	:	-1	1	:	0	:	-0.467	+-	0.014	:	-0.423	+-	0.023
3:	1194	99	0	0	:	10	10	:	0	:	-0.467	+-	0.014	:	-0.423	+-	0.023
4:	2421341	635231	139660	58691	:	1	-1	:	0	:	-0.467	+-	0.014	:	-0.423	+-	0.023
5:	1226	99	1	0	:	10	10	:	0	:	-0.467	+-	0.014	:	-0.423	+-	0.023
.																	
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GL1P scaler counts



Spin pattern



Beam polarization

Some cautions

SpinDB is run by run. Do not access database event by event.
Moreover, it's better to store many runs because it spends much time to access the database.

Be careful about the sign of spin pattern.
It is the value at IP12. The sign is opposite at PHENIX due to Snake.
(If the value is +1 --> Negative helicity or spin down at PHENIX)

For Run5 analyzer:

In addition to above, the sign of spin is reversed due to MCR setup.
(If the value is +1 --> Positive helicity or spin up at PHENIX)
Consistency with previous runs is kept by negative polarization
because we always divide raw asymmetry by the beam polarization.

One issue about SpinDB

What is the plan of run6?

One of the purposes of the spin database is to save “official” numbers. But, usually, long time is needed to fix “official” values and we use Kieran's text files for fast-track analysis.

Utility to read Kieran's files and another text file for the polarization may be useful. Currently I personally use such codes (and Kazuya may know it). Please let us, me and rel. lum. experts, know your opinion. Some of you may be familiar with another text file above, which for run5 is located at `/phenix/WWW/p/draft/fukao/polarization/run5/polarization.dat`

At last

Please follow steps in this slides by yourself.

If you have some trouble, just ask me (or nearest senior) because it is most likely technical problem.

If you have requests, just let me know.

Don't believe numbers blindly. We sometimes do careless mistake. I suggest that you all check numbers as much as possible, for example,

- GL1P scaler counts can be compared with prescaled # of events in DST.
- Spin pattern and beam polarization is also found in spin online monitor.